

Risk Based Insurance Supervision: The View of the Regulator

Schweizer Solvenz Test
Test suisse de solvabilité
Proba di solvibilità svizzera
瑞士偿付能力测试

Philipp Keller, Federal Office of Private Insurance
Zurich, 10 January 2006



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1

Contents

- **FOPI**
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



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2

FOPI

Supervision:

- Solvency: Solvency 1 and SST
- Solvency requirements also for reinsurers
- Supervises legal-entities and groups and conglomerates
- Risk management and corporate governance
- Imposing certain limits on investments and forms of capital
- Market conduct
- Products: approves products and premiums for certain 'social' insurance products (group pension and health insurance)
- Consumer protection: policy holders have the right to request information on their insurance policies
- Supervision of insurance agents and brokers
- Approving merges and licenses new companies
- Answering questions from parliament
- Cooperation with foreign regulators in supervision of international groups and in international standard setting (e.g. with IAIS, Joint Forum, Financial Stability Institute,...)

Founded in 1881

Supervises approx 200 insurers, reinsurers and captives

Formulates regulatory decrees, guidelines etc.

Employs about 70 supervisors working in different departments

Likely to be merged with Swiss Federal Banking Commission (EBK) and Money Laundering Control Authority in 2008+



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3

FOPI: Supervision

Past supervision:

- Based on old Insurance Supervision Act of 1885 and Revised Supervision Act of 1978
- Premium and product control
- Solvency 1 requirements
- Focused on legalistic aspects
- Rule based

Supervision in the future:

- Based on new Insurance Supervision Act (as of 1 January 2006)
- No premium approval except for social insurance (BVG and health insurance)
- Corporate governance and risk management requirements
- Solvency 1 as well as risk based solvency requirements
- Principle based



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4

Contents

- FOPI
- **Current Challenges for Regulators**
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



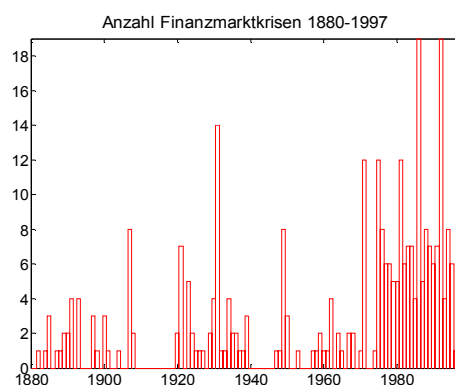
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5

Current Challenges for Regulators

Financial Market Crisis

- 1987: Crash
- 1990: Nikkei Crash, high yield tumble
- 1992: European Currency Crisis (UK suspends participation in European monetary system, Italy devalues Lira, Spain devalues peseta)
- 1994: US interest rates: US Fed raises short term target rate from 3% (Jan) to 8.3% (Dec)
- 1994,1995: Mexican peso crisis, Latin American crisis.
- 1997: Asia crisis (Korean Composite Index -50%, Indonesian Rupiah - 71%,...)
- 1998: Russia crisis (ruble falls 41% from Aug 25-Aug 27)
- 1998: LTCM (depressed equity markets)
- 1999: Brazil crisis
- 2000+: Stock market bubble bursts, dot.com collapse
- 2001+: European life insurance crisis



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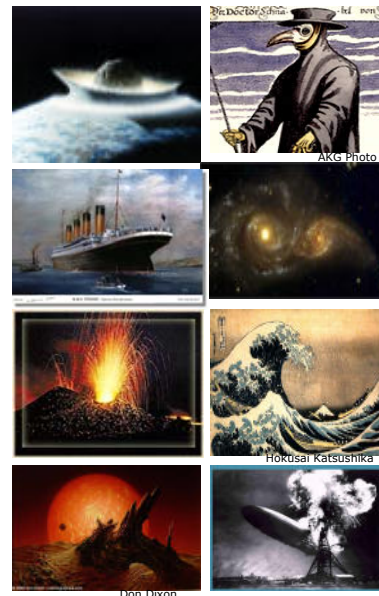
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6

Current Challenges for Regulators

Catastrophes

Jahr	Ereignis	USD m	Jahr	Ereignis	USD m
2005	Katrina	>22000	2001	Hail, Floods, Tomadoes	2277
2001	9/11	21062	1993	Blizzard, Tornados	2220
1992	Hurrican Andrew	20900	1992	Hurricane Iniki	2090
1994	Northridge Earthquake	17312	1989	Explosion	1959
1991	Typhoon Mireille	7598	1979	Hurricane Frederic	1899
1990	Winterstorm Doria	6441	1996	Hurricane Fran	1870
1999	Winterstorm Lothar	6382	1974	Tropical Cyclone Fifi	1859
1989	Hurricane Hugo	6203	1997	Floods in Central Europe	1827
1987	Storm and Floods	4839	1995	Hurricane Luis	1804
1990	Winterstorm Vivian	4476	2002	Storm, Tomados	1707
1999	Typhoon Bart	4445	1988	Hurricane Gilbert	1694
1998	Hurricane Georges	3969	2003	Hurricane Isabel	1685
2001	Tropical Storm Allison	3261	1999	Winterstorm Anatol	1651
2003	Storms, Tomado, Hail	3205	1999	Tornados	1634
1988	Piper Alpha	3100	1983	Blizzards	1619
1995	Earthquake Kobe	2973	2003	Thunderstorms, Hail	1605
1999	Winterstorm Martin	2641	1974	Tornados	1600
1999	Hurricane Floyd	2597	1973	Flooding	1527
2002	Floods across Europe	2548	1998	Wind, Hail, Tomados	1512
1995	Hurricane Opal	2526	1989	Loma Prieta Earthquake	1479
1991	Forest Fires, Drought	2288			



Source: Swiss Re



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7

Current Challenges for Regulators

Reliance on investment profits

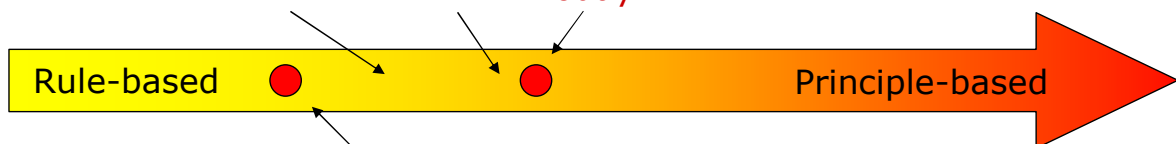
Acceptance of negative technical results to obtain cash to invest in market

Risk management often no issue

Some fixed rules, limits, prudence

Self-regulation

Stock market boom Crash Today



Cartels

Build-up of hidden reserves

Liberalization

international expansion

Competition

Possibly more volatile results, better ALM, possibly different business models

Still some loss making long-tail business in the books (life and non-life)

Smaller investment profits

Scarce capital

Explicit requirements on risk management, risk-based capital requirements, transparency

Strengthening of supervision



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8

Contents

- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
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- SST



Purpose of Insurance Regulation

Insurance is often a long term contract: A policy bought today can be a promise of the insurer to pay at a random future date - up to 50 years later - a random amount. During the contractual period, it is often difficult to sell the product (e.g. only at a loss, replacing policy might be impossible (e.g. due to health state of insured))

The world 50 years ago:

Churchill was still premier minister
Eisenhower finished his first term as US president

No man-made object orbited Earth
Peak speed of the fastest computer (MIT TX0) was 83kOPS, which is approx. 100bn times slower than today's fastest computer

Market Imperfections:

Information asymmetry: Policy holders know less about products than insurers, the products are complex and abstract

Lack of transparency: Accounting information is often not very relevant to assess the financial situation of a insurer

Products are not freely tradable: Once bought, it is often impossible to sell a policy or only at a large loss



Purpose of Insurance Regulation

Policy holder protection by ensuring that

- promises to policy holders will be fulfilled with a high probability
- consumers are protected
- a choice of products is available by promoting a thriving and innovative insurance market

Foster trust in insurance market by ensuring that

- promises are kept
- stakeholders can obtain a realistic picture of the companies

Having a level playing field by

- treating companies equally in the sense that all – small or large - have to fulfill the regulatory requirements
- requiring similar capital requirements from companies having similar risks



Contents

- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- **Insolvencies and Insurance Crises**
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



Insolvencies

Reasons for insolvencies:

- Lack of adequate risk management, leading to large unchecked risk concentrations (e.g. to share market, interest rate movements)
- Inadequate pricing due to competitive pressures
- Excessive growth
- Fraud
- Incompetence
- Inappropriate regulation (e.g. competition by state insurer, uneconomic requirements on pricing/products)
- Often the reason for an insolvency is a mix of different causes
- See also: Sharma report 'prudential supervision of insurance undertakings'

Equitable Life 2001: High promised guarantees could not be serviced anymore and is near-insolvent

HIH 2001: Insolvency of largest P&C insurers of Australia.

Confederation Life 1994: Insolvency of a large Canadian life insurer due to high real estate exposure, mismanagement, freezing of capital fungibility

Gerling Rück: 2002

Mannheimer Versicherung: Portfolio is transferred to German Guarantee Fund (Protector) in 2003

It is not the purpose of insurance regulation to make insolvencies impossible, but to protect the policy holders from the consequences of an insolvency



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13

Insurance Crises

As a regulator, it is important to deal appropriately with insurance crises

- Early identification
- Having a strategy to minimize impact
- Dealing with the consequences

Insurance crises are rare but are often very expensive for the economy and consequences are felt for a long time

Examples:

US: Junk bond crisis 1989-1990: Insurers switched from share exposure (which had large regulatory capital requirements) to junk bonds. Insurers had large losses when junk bond market collapsed

Japan: Crisis of insurers since end of 1980s. Contractually promised returns in life policies can often not be achieved anymore. Participations in ailing Japanese banks further deteriorate balance-sheets of insurers

Europe: Crisis of life insurers since 2000: Contractually promised returns in life policies can often not be achieved anymore. Large exposures to stock markets led to losses when market crashed in 2000/2001



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14

Insurance Crises

A crisis is often caused when insurers are exposed to common risk factors:

- Exposure to financial market risks (e.g. to share or interest rate movements)
- Longevity
- Herd behavior
- Irrational behavior
- ...

-> One way for a regulator of identifying exposure to common risk factors is having insurers evaluate common scenarios (e.g. what happens when interest rates go down and stay low, what happens when mortality decreases more than expected, etc.)

-> Scenarios are an indispensable part of any modern risk based solvency system

Insurance supervisors should identify early risk concentrations and try to effect corrective measures



Insurance Crises

Reactions to a crisis:

In the past, some regulators and troubled companies sometimes tried to downplay magnitude of problem, often by changing accounting rules (e.g. going over to book value of bonds) or by changing regulation (e.g. by decreasing capital requirements, allowing 'exotic' assets to be counted for solvency capital, etc.)

Problems with this approach:

- Crises can worsen over time
- Companies start gambling on resurrection by going into more risky assets
- Troubled companies drag market down by making it difficult for healthy insurers to compete
- Policy holder do not know true economic state of insurers
- Senior managements feels it has a (free) option to draw on taxpayers' capital



Insurance Crises

Each crisis is special and asks for a specific regulatory action
However, during each crisis it is important to restore trust in the market by

•Fostering transparency:

- Inform on the crisis and discuss with stakeholders openly the possible solutions
- Intransparency favors financially weak companies and smaller stakeholders (e.g. policy holder, small investors) since sophisticated investors generally know about the financial state of companies and the market

•Acting consistently:

- No exceptions for specific troubled companies
- Employ law irrespective of size of companies
- Having made exceptions and special deals will be widely known within the market and destroys trust in the regulator



Guarantee Funds

Some regulatory systems introduced guarantee funds which take over liabilities of insolvent insurers:

Germany: After default of Mannheimer Versicherung, Protektor was created to take over liabilities

US: Pension Benefit Guarantee Corporation for insolvent pension schemes

Problems with guarantee funds:

Moral Hazard, gives wrong incentives:

Example: Large US companies unload their pension liabilities on the PBGC and continue to be in business. PBGC has a deficit of US 23bn (mid 2005) and rising



Contents

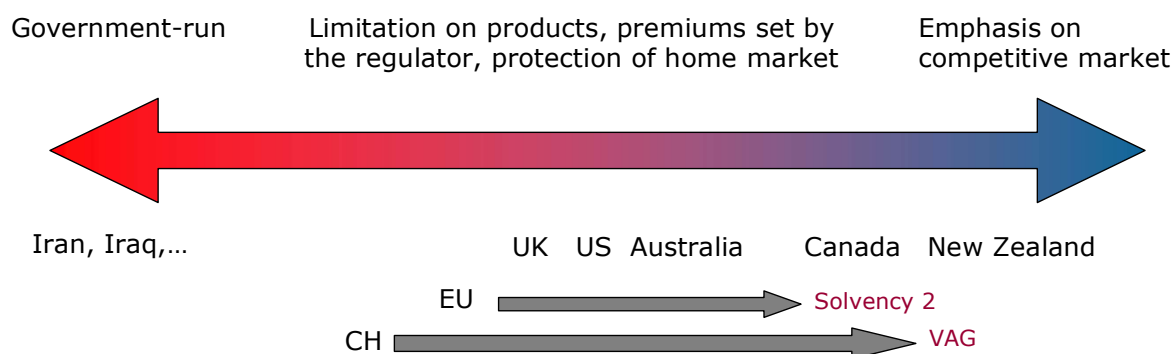
- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



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19

Elements of Insurance Supervision



The Swiss situation before 1990: Cartelistic insurance market, premiums set by regulator, very few foreign competitors (<2% market share)

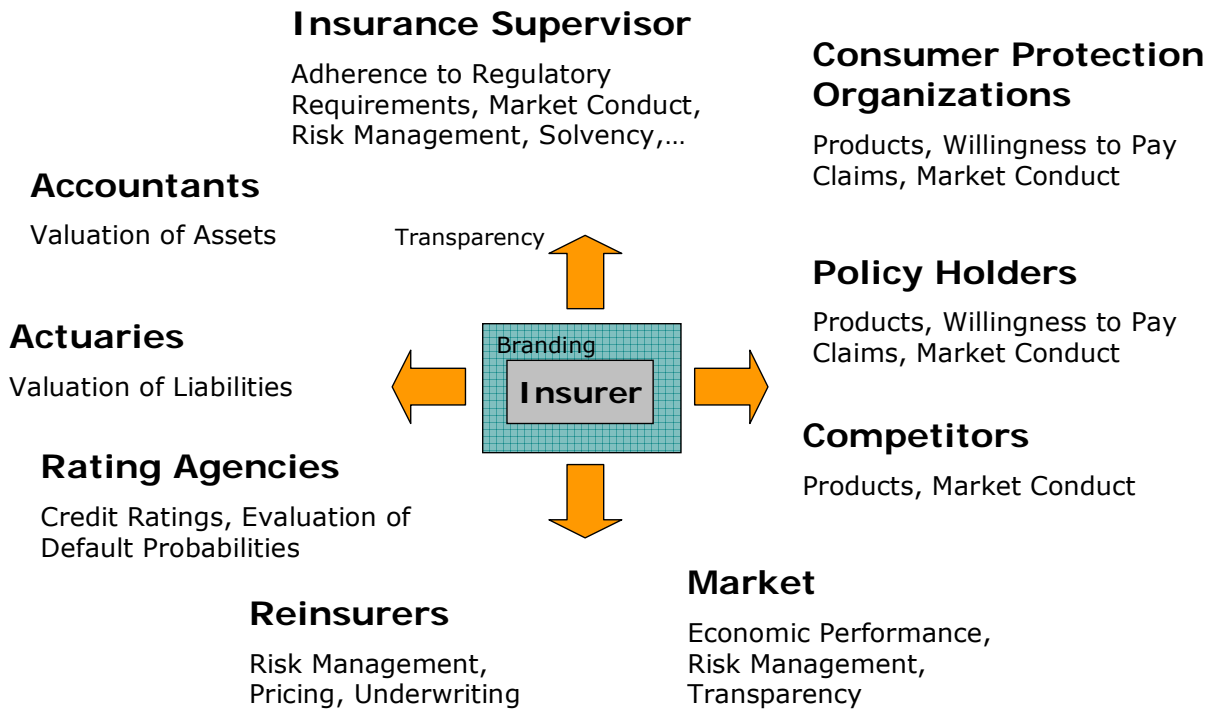
After 1980s: Price competition first in P&C insurance, later partly in life insurance, market share of foreign insurers 15%-20%



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20

Elements of Insurance Supervision



Elements of Insurance Supervision

Accountants and Actuaries:

In most regulatory frameworks, accountants and actuaries play an important role in the supervision of insurers:

Accountants for the valuation of assets and **actuaries** for the valuation of liabilities

The US framework relies mainly on accountants, UK mainly on actuaries, CH is in-between

Accountants and actuaries have in most countries a code of conducts and elaborate professional ethical standards in order to signal trustworthiness to the regulators

In Switzerland:

- Accountants audit valuation of liabilities for the statutory solvency
- Appointed actuaries are responsible for the statutory valuation of liabilities
- For the risk based solvency test (SST), senior management is responsible: For the SST, different departments of an insurer (e.g. risk management, actuaries, investment officers, etc.) have to work together



Elements of Insurance Supervision

Transparency:

Public transparency is indispensable for market forces to be effective in promoting adequate behavior

Examples: CH-GAAP, US-GAAP, IFRS, ... are public and inform investors and analysts on assets and liabilities

In many countries, solvency ratios are public information (not in CH) to enable policy holders to make more informed choices

Many companies disclose information voluntarily on risk exposures etc. as a signal to the market

Historically, Swiss regulation did not promote transparency: For example, solvency ratios of insurers are not public

In the future, market will force more disclosure, also of true economic situation of companies, not only of accounting numbers

Often voiced arguments against transparency:

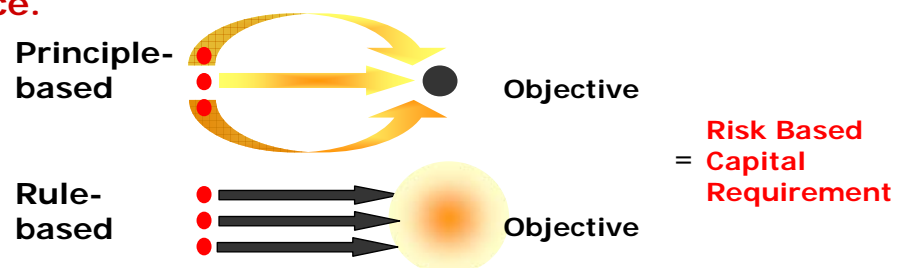
Insurance is complex and the public will be confused

Disclosure of solvency ratios will aggravate problems of ailing insurers

Elements of Insurance Supervision

Principles vs. Rules

Principle-based standards describe the objective sought in general terms and require interpretation according to the circumstance.



Principles will have to be interpreted according to their intention, not legalistically by senior management and by the supervisor

Any rule based framework, by taking away responsibility from companies, tends to be arbitrated again and an "arms race" between the rule-makers and the arbitrageurs will lead to a proliferation of rules to fill loop-holes.

If principles will be interpreted legalistically by companies, regulation will deteriorate rapidly to a rule-based, compliance driven framework with high compliance and legal costs for all

Contents

- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



Risk Management

Wir müssen wissen. Wir werden wissen

David Hilbert

Risk management is responsible for identifying, assessing, analyzing, quantifying and then transferring, mitigating or accepting of risk

For risk management to be effective, there needs to be a risk culture such that senior management wants to know and risk management is able to tell the "truth" about the risks

Senior management and the board have to ensure that there is a honest dialog and transparency regarding risks within the company

Risk management is not solely about control but about confronting issues and uncomfortable truths openly and honestly

A risk based supervisory framework should be such that it fosters a climate in the market where an appropriate risk culture and risk management is rewarded

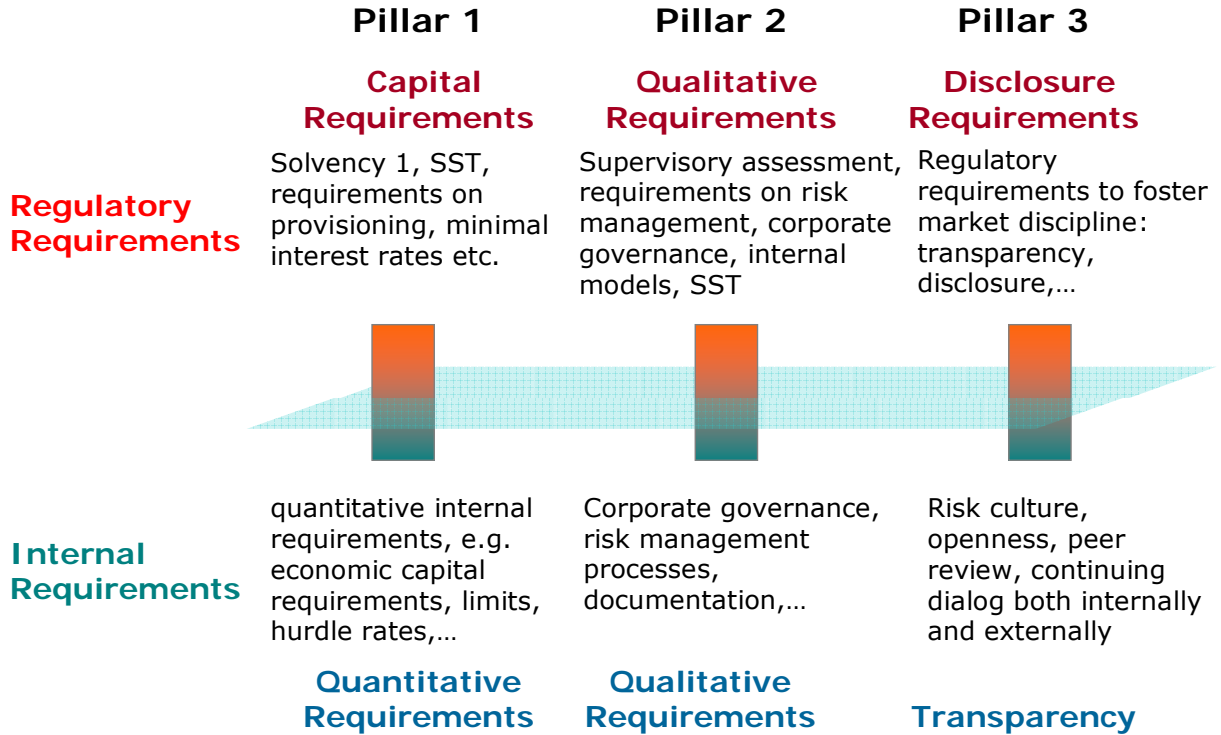
→ principles instead of rules

→ responsibility with senior management

→ transparency and trust in market and in regulator



Risk Management: The Three Pillars

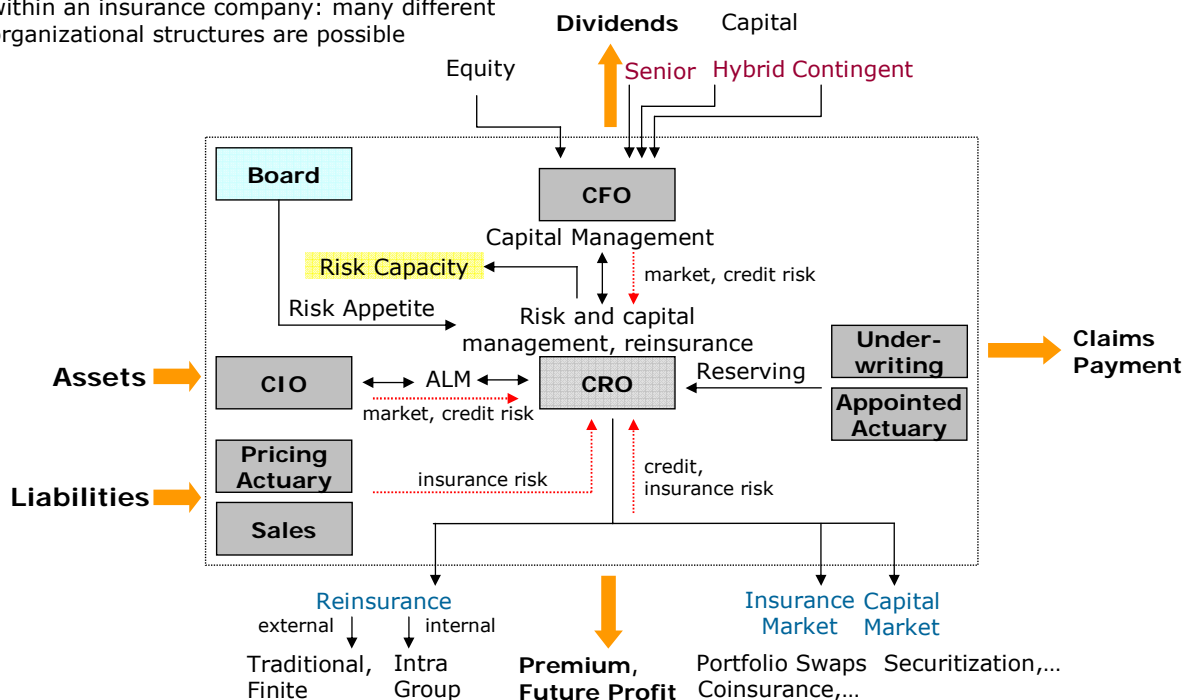


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27

Risk Management

Possible set-up of risk and capital management within an insurance company: many different organizational structures are possible



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28

Risk Management

Warren Buffett's three key principles for running a successful insurance business:

- They accept only those risks that they are able to properly evaluate (staying within their circle of competence) and that, after they have evaluated all relevant factors including remote loss scenarios, carry the expectancy of profit. These insurers ignore market-share considerations and are sanguine about losing business to competitors that are offering foolish prices or policy conditions.
- They limit the business they accept in a manner that guarantees they will suffer no aggregation of losses from a single event or from related events that will threaten their solvency. They ceaselessly search for possible correlation among seemingly-unrelated risks.
- They avoid business involving moral risk: No matter what the rate, trying to write good contracts with bad people doesn't work. While most policyholders and clients are honorable and ethical, doing business with the few exceptions is usually expensive, sometimes extraordinarily so.

February 28, 2002, Warren E. Buffett

An insurance regulator should set incentives such, that good risk management practices are rewarded:

- setting transparent requirements
- putting responsibility to the board and senior management
- Enforce requirements consistently



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29

Prudential Supervision: Pitfalls to Avoid

Risk management is crucial, however, there are some pitfalls to avoid

The Regulation of Everything

Regulation should concentrate on relevant risks

Self-regulation and market forces should have their place

The Myth of Auditability

Audits should not be used to abrogate responsibility

Over-reliance on auditability can lead to check-box mentality both within the industry and the regulator

Limits of Quantification

Residual risks (e.g. operational risks) can become blown up all out of proportion

Due to lack of data and clear concepts, pseudo-quantifications are used for capital requirements

Dangers of Secondary Risk Management

Excessive reflection on risks can lead to the perception that danger lurks everywhere

Risk management should deal with a company's risks, not manage their own risk

Excessive Internal Control

Excessive internal control can lead to a bureaucratic, risk averse company



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30

Contents

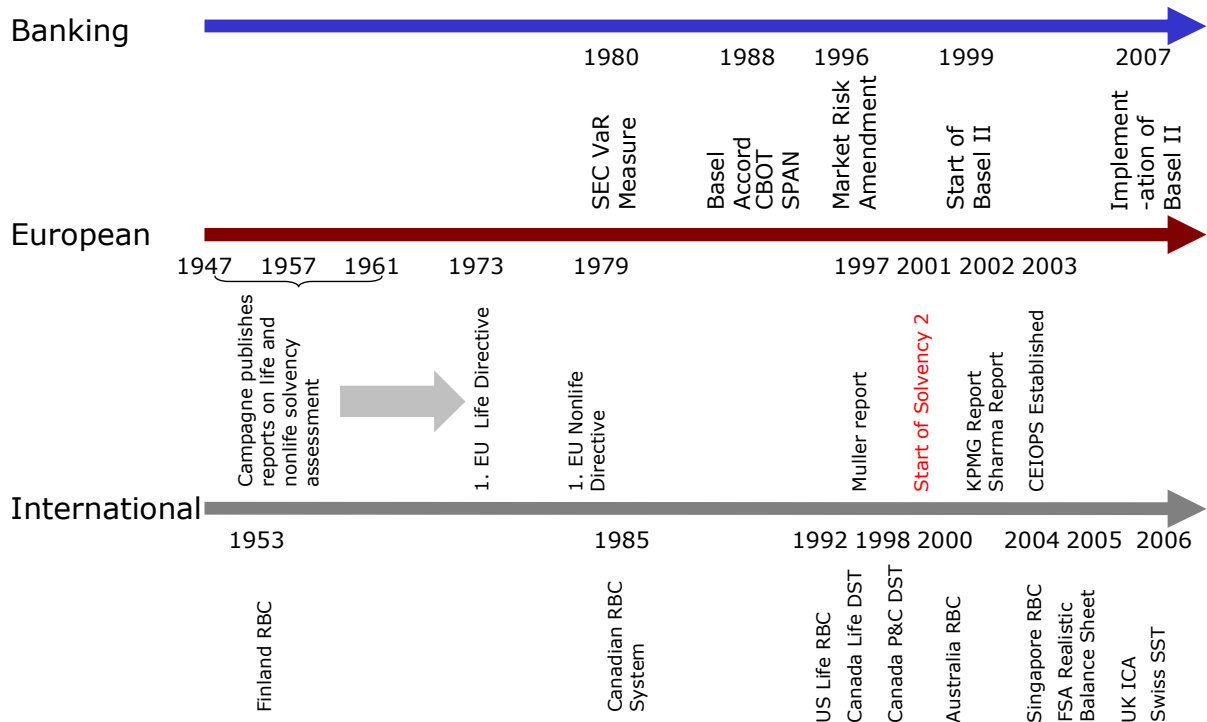
- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- **Regulatory Initiatives**
- SST



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31

Regulatory Initiatives



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32

Regulatory Capital Models

A rough typology

Factor Models: Linear combination of volume measures

$$C = a_1 * v_1 + a_2 * v_2 + \dots + a_n * v_n$$

RBC Models: Risk charges C1,C2,... are combined

$$C = C_1 + \sqrt{C_2^2 + (C_3 + C_4)^2}$$

Scenario Based Models:

$$C = f(S_1, \dots, S_n)$$

Hybrid Models: A mix of several types of approaches

Internal Model based

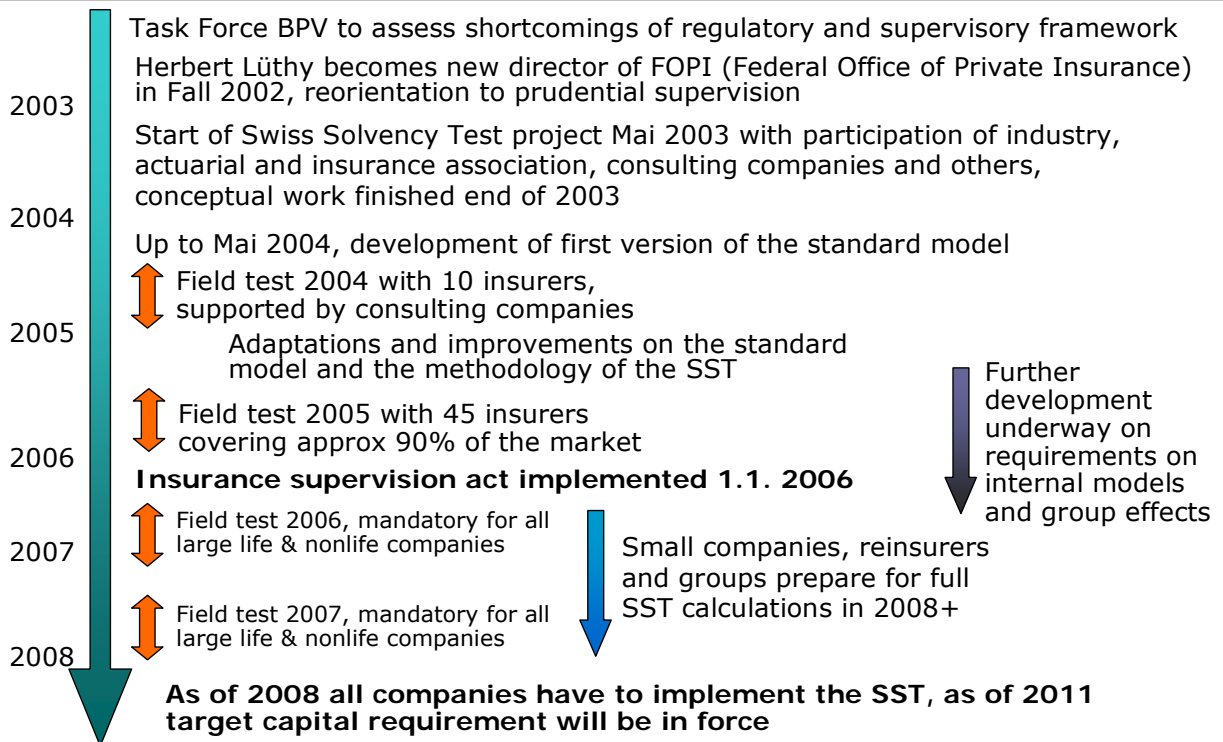


Contents

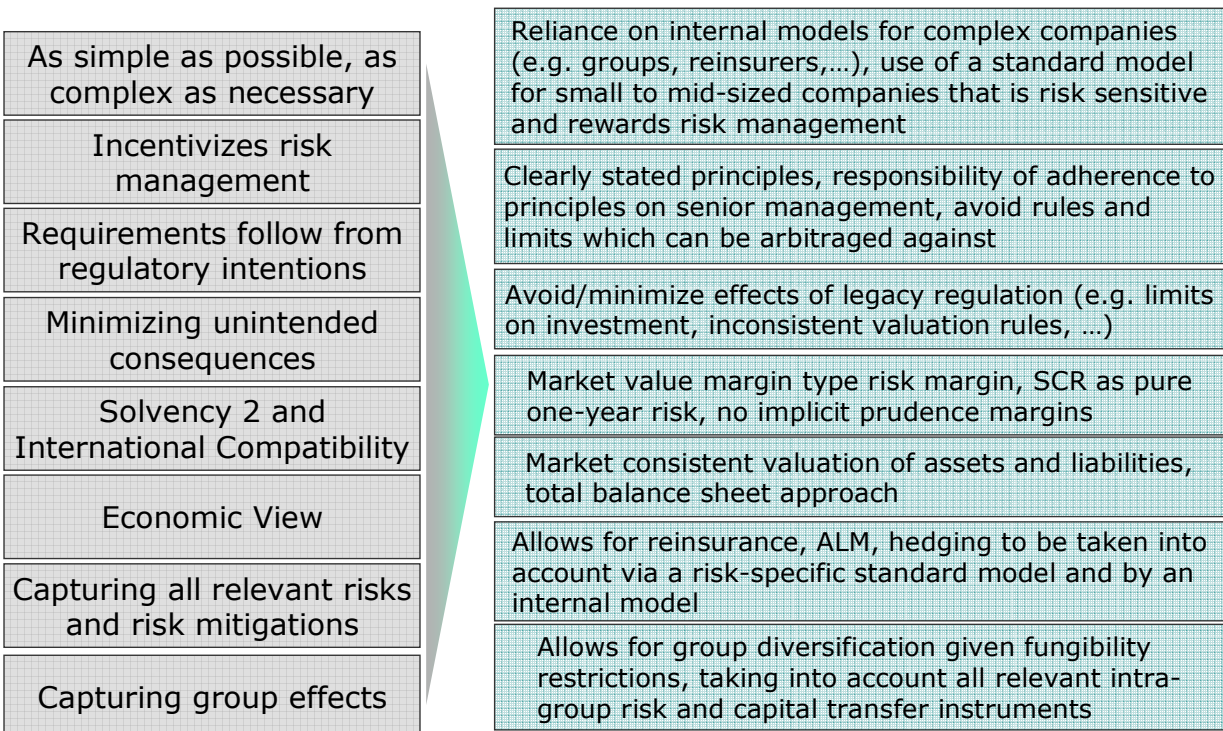
- FOPI
- Current Challenges for Regulators
- Purpose of Insurance Regulation
- Insolvencies and Insurance Crises
- Elements of Insurance Supervision
- Risk Management
- Regulatory Initiatives
- SST



Timeline of the SST Development



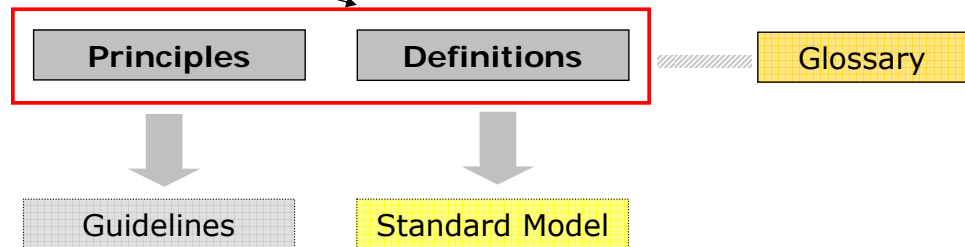
Requirements of the SST



The SST Concept: Principle-Based

The more laws and order are made prominent, the more thieves and robbers there will be, Lao-tzu

Core of the Solvency Test



The SST is defined not by the Standard Model but by underlying principles

- Principles define concisely the objectives
- Definition of terms and concepts so that meaning and possible interpretation of principles become clear
- Guidelines help in interpretation
- Standard Model allows use of Solvency Test also by small companies



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37

The SST Concept: Principle-Based

Defines
Output

1. All assets and liabilities are valued market consistently
2. Risks considered are market, credit and insurance risks
3. Risk-bearing capital is defined as the difference of the market consistent value of assets less the market consistent value of liabilities, plus the market value margin
4. Target capital is defined as the sum of the Expected Shortfall of change of risk-bearing capital within one year at the 99% confidence level plus the market value margin
5. The market value margin is defined as the cost of the present value of future required regulatory capital for the run-off of the portfolio of assets and liabilities
6. Under the SST, an insurer's capital adequacy is defined if its target capital is less than its risk bearing capital
7. The scope of SST is legal entity and group / conglomerate level domiciled in Switzerland
8. Scenarios defined by the regulator as well as company specific scenarios have to be evaluated and, if relevant, aggregated within the target capital calculation



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38

The SST Concept: Principle-Based

Defines
How-to

9. All relevant probabilistic states have to be modeled probabilistically
10. Partial and full internal models can and should be used
11. The internal model has to be integrated into the core processes within the company

Transpar-
ency

12. SST Report to supervisor such that a knowledgeable 3rd party can understand the results
13. Disclosure of methodology of internal model such that a knowledgeable 3rd party can get a reasonably good impression on methodology and design decisions

Responsi-
bility

14. Senior Management is responsible for adherence to principles



The SST Concept: The economic view

How to measure risks?

- Accounting risk or economic risk?

Reported earnings follow the rules and principles of accounting. The results do not always create measures consistent with underlying economics. However, corporate management's performance is generally measured by accounting income, not underlying economics. Therefore, risk management strategies are directed at accounting, rather than economic performance.

Enron in-house risk-management handbook

For a risk-based solvency system, risks need to be measured objectively and consistently → economic risk rather than accounting risk

→ **Market Consistent Valuation of Assets and Liabilities**



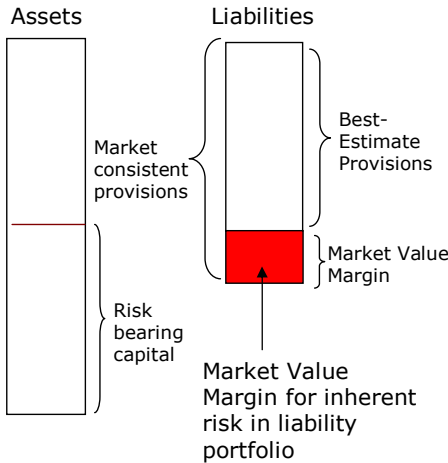
The SST Concept: The economic view

Market Consistent

Wherever possible, **market-consistent valuation** is based on observable market prices (**marking to market**)

If such values are not available, a market-consistent value is determined by examining **comparable market values**, taking account of liquidity and other product-specific features, or on a model basis (**marking to model**)

Market-consistent means that up to date values are used for all parameters



Best-estimate = **Expected value** of liabilities, taking into account all up to date information from financial market and from insurance.

All relevant options and guarantees have to be valued.

No explicit or implicit margins

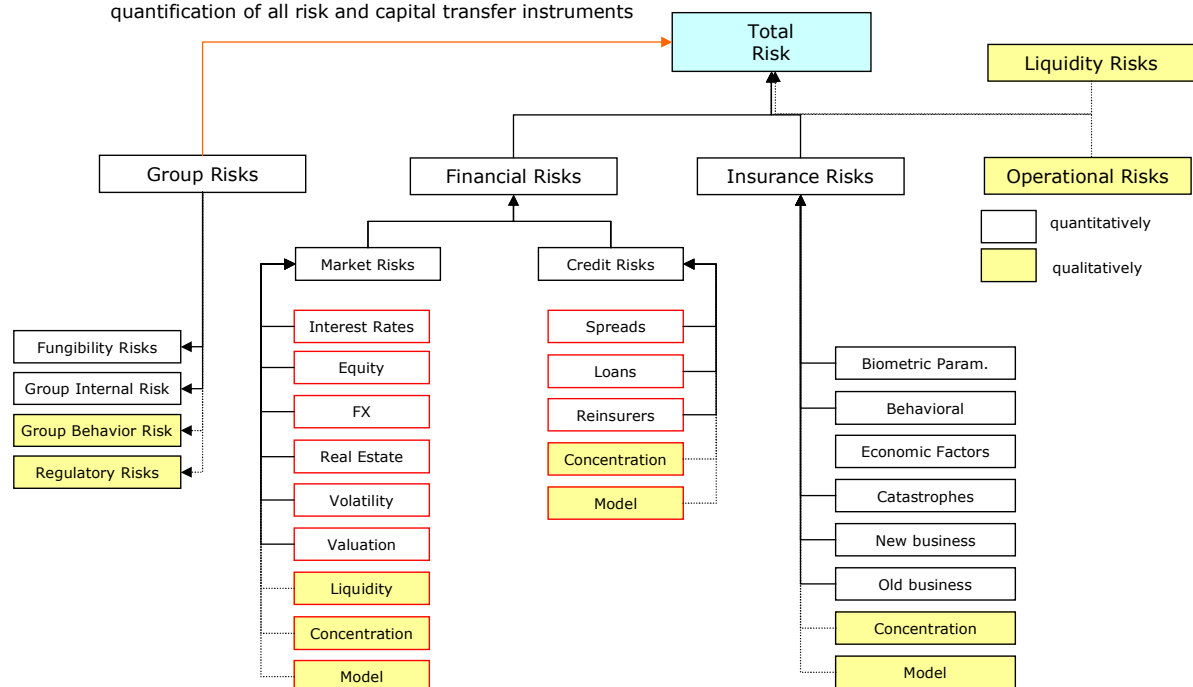
Discounting with risk-free interest rate

Valuation of policyholder-options: Assume realistic behavior of policy holders, but option exercise depends on financial market parameters
One approach to value options is using replicating portfolio of traded financial instruments

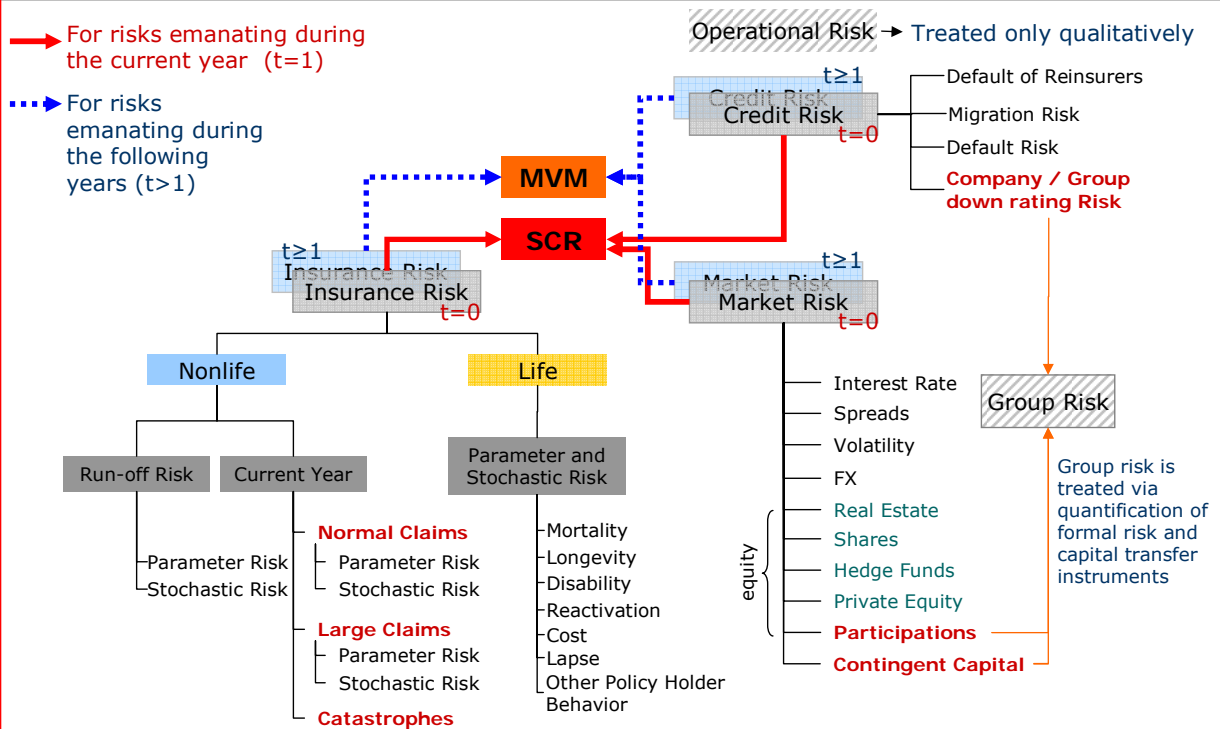


The SST Concept: Risk Classification

Group effects are taken into account by requiring quantification of all risk and capital transfer instruments



Quantification of Risks within the SST



The SST Concept: General Framework

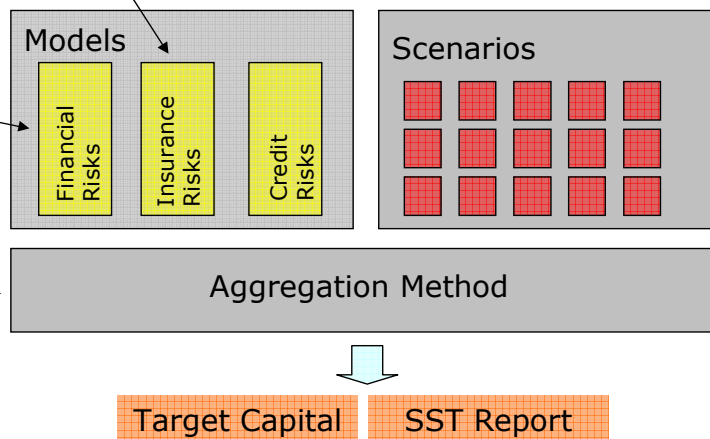
Standard Models for insurance risk:
 Nonlife: Split into small and large claims and catastrophes
 Life: biometric and policy holder behavior risk modeled using multivariate normal approach

Mix of predefined and company specific scenarios
 Scenarios add approx. 15% (median) to capital requirement.
 Credit risk of reinsurers' default modeled using a scenario (adding btw.) 0.01% and 7% to capital requirement

Credit risk calculated using Basel II or portfolio model (e.g. credit metrics)

Asset-Liability Model using covariance approach

Aggregation by weighted average of different distribution functions (weight = probability of scenarios occurring)



The SST Concept: Scenarios

Historical Scenarios: Stock Market Crash 1987, Nikkei Crash 1989, European Currency Crisis 1992, US Interest Rates 1994, Russia / LTCM 1998, Stock Market Crash 2000

Financial Distress: Increase of i.r., lapse, no new business, downgrading of company,...

Deflation: decrease of i.r.

Pandemic: Flu Pandemic with given parameters (number of deaths, sick-days, etc.)

Longevity

Reserving: Provisions have to be increased by 10%

Hail (Swiss specific): Given footprints

Default of Reinsurer: Reinsurer to which most business has been ceded defaults

Industrial Accident: Accident at chemical plant

Personal Accident: large accident during company outing or mass panic in soccer stadium

Anti-selection for Health Insurers: all insured with age < 45 lapse

Collapse of a dam (Swiss specific)

Terrorism

Global Scenarios (for groups&reinsurers)

Property Cats (earthquake, windstorm)

Special Line Cats: Aviation (2 planes collide, marine event, energy event, credit&surety event)



International Comparison

	SST	Solvency 2	IAIS	
Principle Based	x	x	x	Compatible with principles of Solvency 2
Total Balance Sheet	x	?	x	
Internal Model	x	x	x	SST is mostly compatible IAIS cornerstones
MCR & SCR	x	x	x	
Modular Approach	x	?	?	If necessary, SST is sufficiently flexible to be adjusted to Solvency 2 / IAIS
Risk Measure	TVaR	VaR or TVaR	?	
Time Horizon	1 Year	1 Year	short- & longterm	
Explicit Risk Margin	x	?	x	Possible divergences to Solvency 2:
Risk Margin	Cost of Capital	75% Quantile ?	-	
Diversification	Portfolio	x	x	•Risk Measure (TailVaR vs VaR)?
	Risk	x	x	
	Legal Entity	x	?	
	Group	x	?	
Solo & Group Level	x	x	x	•Use of group diversification on legal entity level?
Risks	Insurance	x	x	
	Market	x	x	
	Credit	x	x	
	Operational	x	?	•Only qualitative treatment of operational risks
Analytical	x	x	-	
Scenario	x	?	-	



